

REMARKS

I. **STATUS OF CLAIMS**

Claims 1-20 are all the claims pending in this application. Claims 1-4, 19 and 20 are under consideration. Claims 5-18 have been withdrawn.

II. **RESPONSE TO CLAIM REJECTION UNDER 35 U.S.C. §102**

Claims 1-4 are rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Kanegae et al. (U.S. Patent App. Pub. No. 2002/0061654 A1), hereinafter referred to as Kanegae.

In the matter of claim 1, Applicants respectfully traverse the rejection.

Applicants respectfully submit that **710** relates to the side-walls of the opening, whereas **104b** relates to the bottom of the opening, as described in Kanegae. Furthermore, at paragraph [0165] of Kanegae, it is stated that Figs. 5(a)-6(b) show the results of XPS analyses of four different types of organic/inorganic hybrid film **104** that were formed under different deposition conditions, where the depth of the film is plotted along the x-axis, and the film depth is related to sputter time. Therefore, Figs. 5(a)-6(b) are actually showing the composition solely of the organic/inorganic hybrid film **104**, *i.e.*, before formation of **710**. Fig. 7 is equivalent to Fig. 6(c), except that in the case of Fig. 7, the actual depth is shown, and not the sputter time. As a result, no conclusion can be reached about the composition of **710** based on Figs. 5(a)-7.

Furthermore, the Applicants respectfully submit that one feature of the present invention is that the insulating film does not contain any C or N, but a modification layer is formed on the film surface which contains C and N.

Applicants assert that Fig. 5(a) of Kanegae demonstrates that quantities of C and N decrease near the surface of an insulating film composed of Si, C, O and N. Specifically, it is

shown that N is not detected to a depth of approximately 10 nm from the surface of the film, and C is also not detected in most of the surface, *i.e.*, Kanegae suggests the formation of a modification layer in which C and N are removed from the film surface, unlike the present invention.

Therefore, Applicants respectfully submit that the Examiner's characterization of the present invention appears to be flawed, and thus request reconsideration and withdrawal of the rejection of claim 1.

In the matter of claim 2, Applicants respectfully submit that the claim is in condition for allowance at least by virtue of its dependence on claim 1 in view of the above arguments, and further in view of the following arguments.

The present specification states the following, “[i]t should be noted that modified layer **5a** is not an etching attachment formed from carbon and fluorine emitted into plasma in the etching of the organic insulating film 5” (emphasis added), and that the etching attachment is “substantially perfectly removed in an organically rinsing step”. The specification further states that the etching attachment contains nitrogen and fluorine, but that the fluorine concentration is higher than that of nitrogen and therefore “this etching attachment causes the copper of the wiring to be corroded” (emphasis added). See pages 19, line 27 to page 20, line 15. Also see table at Fig. 9, for comparison of the components of the etching attachment and **5a** (after organic rinsing).

In response to Applicants' previous arguments in this regard, the Examiner states that “it is inherent, if not obvious to one of ordinary skill in the art to recognize that some fluorine concentration would be present in the hybrid film” because of the etching chemical used. The

Applicants respectfully submit that the Examiner's rejection does not have merit since in the present invention the "etching attachment" is removed as a result of organic rinsing.

Applicants therefore request reconsideration and withdrawal of the rejection of claim 2.

In the matter of claims 3 and 4, Applicants respectfully submit that the claims are in condition for allowance at least by virtue of their dependence on claims 1 and 2 in view of the above arguments, and further in view of the following arguments.

The Examiner bases his rejection on Fig. 15(b) of Kanegae. As seen in Fig 15(b), ref. no. **508** is in contact with the CMP stopper film (505), an interlayer insulating film (504), the etching stopper film (503), and a low interconnection made of a copper film (502). However, none of these layers is the modified layer of the present invention.

Furthermore, as discussed previously, the Examiner has used the example of **710** of Kanegae in his rejection of claim 1. Figs. 20(a)-21(c) are the only figures which depict **710**. In these figures, there is no depiction of a copper wire. It should also be noted that at paragraph [0310] it is stated that "the reformed layer **710** may be removed by oxide film etching.

Thereafter, a metal film made of copper film or tungsten film is deposited on the entire surface of the silicon oxide film" (emphasis added), which further shows that the copper film is not in contact with the modified organic/inorganic layer.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 3 and 4.

III. RESPONSE TO CLAIM REJECTION UNDER 35 U.S.C. §103

Claims 2-4, 19 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kanegae. Furthermore, claims 19 and 20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kanegae as applied to claim 4 above, and further in view of Shinichi (Japan Patent App. Pub. No. 2000-114367).

Applicants respectfully submit that claims 2-4 and 19-20, are patentable at least by virtue of their dependence from claim 1, in view of the above arguments. Furthermore, claims 19 and 20 are in condition for allowance in view of the following.

Claims 19-20 are patentable because Shinichi does not remedy the deficiencies in Kanegae that are discussed above. Therefore, a person of ordinary skill in the art would not have found it obvious to combine the elements of Kanegae with those of Shinichi with any reasonable expectation of success.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 19 and 20.

IV. CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned attorney at the telephone number listed below.

AMENDMENT UNDER 37 C.F.R. § 1.116
Application No.: 10/509,898

Attorney Docket No.: Q83944

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE

23373

CUSTOMER NUMBER

Date: March 17, 2008

/Howard L. Bernstein/ hlb
Howard L. Bernstein
Registration No. 25,665